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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,254	07/22/2003	George E. Kim	UC1.PAU.22	7355

23386 7590 12/14/2005

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EXAMINER	
MCNEIL, JENNIFER C	

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 12/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/624,254	KIM ET AL.	
	Examiner	Art Unit	
	Jennifer C. McNeil	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, and 11-15 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The steps of cryomilling a NiCrAlY powder and thermally spraying the cryomilled powder appear to be critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). To achieve the nanocrystalline, nano-composite bond coat, the step of cryomilling and thermally spraying the NiCrAlY bond coat appears to be essential in forming the article, and as such, this limitation should be in the independent claims.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11, 23, 24, 30, 31, and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 11, there is no antecedent basis for "the nanocrystalline alumina coating". Regarding claims 23 and 24, it is not clear from the specification that the bond coat may be formed of alumina. The bond coat is repeatedly referred to as MCrAlY, and a subsequent alumina layer is formed thereon. Regarding claim 31, is the MCrAlY bond coat the same as the nanostructured nanocomposite bond coat? Regarding claims 30 and 36, the clais state

refining "after" cryomilling comprises introducing alumina "during" cryomilling. It is not clear where in the method this step is performed. Please clarify.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 13, 25-27, and 31-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Hebsur (US 6,805,725). Hebsur teaches a bond coat comprising NiAl and CoCrAlY which is cryomilled in nitrogen, and plasma sprayed onto a substrate. A ceramic top coat is formed over the bond coat. During cryomilling, AlN particles are formed in the bond coat and have a particle size of 10-50 nanometers. This is considered nanostructured. The bond coat is formed via a method that is commensurate with that of the instant specification; therefore the article is expected to share similar characteristics.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 3, 4, 5, 6, 14, 15, 16, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hebsur (US 6,805,725) in view of Stamm (WO 99/55527 or US 6,610,419). Hebsur teaches a nanostructured bond coat as discussed above and further includes a stabilized zirconia layer as a top coat. Hebsur does not specify what oxide is used to stabilize the zirconia. Stamm teaches a bond coating for a metal substrate comprising MCrAlY, and a top coat of yttria stabilized zirconia. It would have been obvious to one of ordinary skill in the art at the time of the invention to use yttria to stabilize the top coat of Hebsur as it is clearly taught by Stamm as successfully stabilizing zirconia, and is used as a top coat for a thermal barrier coating. Regarding claims 4 and 16, Hebsur teaches cryomilling followed by thermal spray (air exposure). Regarding claims 5 and 17, Hebsur teaches cryomilling in a nitrogen atmosphere. Regarding claims 6 and 18, Hebsur teaches cryomilling for 16 hours. Regarding claim 14, Hebsur teaches deposition of the bond coat via LPPS. Regarding claims 3 and 15, Stamm teaches a bond coat having overlapping ranges with that of the instant claims (col. 1).

Claims 7, 8, 11, 12, 19, 20, 23, 24, 28, 29, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hebsur (US 6,805,725) in view of Hebsur et al (US 5,635,654). Hebsur '725 teaches a bond coating formed via cryomilling as discussed above, but does not teach formation of aluminum oxide during cryomilling. Hebsur '654 teaches a bond coating similar to that of Hebsur '725, and further teaches that depending on the material system being used, cryomilling can be reacted with nitrogen or oxygen. As discussed in both patent, nitrogen forms AlN particles in the bond coating, and Hebsur '654 teaches that oxygen forms alumina on the powder particles. As Hebsur '654 teaches that NiAl may be cryomilled with oxygen or nitrogen depending upon the

material system being used, it would have been obvious to one of ordinary skill in the art at the time of the invention that the bond coating of Hebsur '725 could also be cryomilled with oxygen. Furthermore, Hebsur teaches that the net result of milling NiAl in liquid nitrogen is an arrangement of fine particles of AlN, NiAl, and alumina on the NiAl powder surface (col. 2, lines 15-22). With this teaching, it is expected that the bond coat of Hebsur '725 would already possess alumina particles in addition to the AlN particles.

Claims 9, 10, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hebsur (US 6,805,725) in view of Hebsur et al (US 5,635,654), and further in view of Zhao et al (US 2003/0186075). Hebsur '725 and Hebsur '654 teach bond coatings as discussed above, but do not include an alumina layer formed on the bond coat. Zhao teaches a bond coating where upon exposure to high temperatures in an oxidative environment, a thin, compact, and tightly adherent layer of oxide scale is formed at the interface of the bond coat and the ceramic top coat. This thermally grown oxide significantly reduces the ability of oxygen to diffuse into the coating and attack the substrate. It would have been obvious to form an alumina coating in both Hebsur '725 and Hebsur '654 as Zhao clearly teaches that it is normally formed between the bond coat and the ceramic top coat, and that is provides protection to the underlying substrate from oxidation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer C. McNeil whose telephone number is 571-272-1540. The examiner can normally be reached on 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer C McNeil
Primary Examiner
Art Unit 1775

JCM